CLAIMS

1. A method for aligning a feed forward radio frequency power amplifier, the method comprising applying a radio frequency test signal to the feed forward radio frequency power amplifier and monitoring characteristics of an error cancellation loop of the feed forward radio frequency power amplifier, without opening a break point of the feed forward radio frequency amplifier.

2. A system for aligning a feed forward radio frequency power amplifier, the system comprising a signal source configured to provide a radio frequency signal to the feed forward radio frequency power amplifier and a signal monitor configured to monitor a radio frequency signal from the feed forward radio frequency power amplifier, wherein the signal source and the signal monitor are configured to cooperate with the feed forward radio frequency power amplifier in a manner which facilitates alignment of the error loop thereof without opening a break point of the feed forward radio frequency power amplifier.

3. A feed forward radio frequency power amplifier comprising a signal cancellation loop and an error cancellation loop, the error cancellation loop being configured so as to facilitate alignment thereof without the use of a breakpoint.

4. A method for automatically aligning a feed forward loop in a radio frequency power amplifier, the method comprising:

applying a radio frequency signal to an input of the radio frequency power amplifier;

splitting the radio frequency signal;

communicating the radio frequency signal through both legs of one loop of the radio frequency power amplifier;

combining radio frequency signals from both legs of the loop; and

monitoring the combined radio frequency signal from a selected point of the radio frequency power amplifier.

5. The method as recited in claim 4, wherein no breakpoints are open in the radio frequency power amplifier when the radio frequency signal is communicated through both legs of the loop.

6. The method as recited in claim 4, further comprising:

facilitating communication of a radio frequency signal from a signal cancellation loop delay to an error cancellation loop group delay adjuster to facilitate alignment of the signal cancellation loop of the radio frequency power amplifier; and

wherein the selected point of the radio frequency power amplifier provides a signal representative of an output of the error cancellation loop group delay adjuster.

7. The method as recited in claim 4, further comprising:

closing a switch so as to facilitate communication of a radio frequency signal from a signal cancellation loop delay to an error cancellation loop group delay adjuster to facilitate alignment of the signal cancellation loop of the radio frequency power amplifier; and

wherein the selected point of the radio frequency power amplifier provides a signal representative of an output of the error cancellation loop group delay adjuster.

8. The method as recited in claim 4, further comprising:

closing a switch so as to facilitate communication of a radio frequency signal from a signal cancellation loop delay to an error cancellation loop group delay adjuster to facilitate alignment of the signal cancellation loop of the radio frequency power amplifier;

terminating an output of the radio frequency power amplifier; and

wherein the selected point of the radio frequency power amplifier provides a signal representative of an output of the error cancellation loop group delay adjuster.

9. The method as recited in claim 4, further comprising:

inhibiting communication of a radio frequency signal from a signal cancellation loop delay to an error cancellation loop group delay adjuster to facilitate alignment of the error cancellation loop of the radio frequency power amplifier; and

wherein the selected point is an output of the radio frequency power amplifier.

10. The method as recited in claim 4, further comprising:

opening a switch so as to inhibit communication of a radio frequency signal from a signal cancellation loop delay to an error cancellation loop group delay adjuster to facilitate alignment of the error cancellation loop of the radio frequency power amplifier; and

wherein the selected point is an output of the radio frequency power amplifier.

11. The method as recited in claim 4, wherein applying a radio frequency signal to an input of the radio frequency power amplifier comprises applying a swept frequency signal to the input.

12. The method as recited in claim 4, wherein applying a radio frequency signal to an input of the radio frequency power amplifier comprises applying a swept frequency signal from a network analyzer to the input.

13. The method as recited in claim 4, further comprising using a controller to select the point from which the radio frequency signal of the power amplifier is monitored.

14. The method as recited in claim 4, further comprising using an automatic test equipment controller to select the point from which the radio frequency signal of the power amplifier is monitored.

15. The method as recited in claim 4, further comprising using a personal computer to select the point from which the radio frequency signal of the power amplifier is monitored.

16. The method as recited in claim 4, further comprising controlling a state of a switch via a controller, the switch facilitating/inhibiting communication of a radio frequency signal from the signal cancellation loop delay to the error cancellation loop group delay adjuster.

17. The method as recited in claim 4, further comprising controlling the application of the radio frequency signal to the input of the radio frequency power amplifier via a controller.

18. The method as recited in claim 4, further comprising:

measuring a first complex gain along a passive path of a selected loop with the gain of the active path minimized;

measuring a second complex gain along a composite path of the selected loop;

determining a relative complex gain from the first and second complex gains; and

adjusting alignment of the selected loop based upon the relative complex gain.

19. The method as recited in claim 4, further comprising:

measuring complex gain $(S21)^p$ along a passive path of a selected loop with the gain of the active path minimized;

measuring complex gain $(S21)^c$ along a composite path of the selected loop;

determining a relative complex gain $(S21)^e$ according to the formula $(S21)^e = 1 - (S21)^c / (S21)^p$; and

adjusting an alignment of the selected loop so as to make relative complex gain $(S21)^e$ magnitude approximately equal to 0 while also making relative complex gain $(S21)^e$ phase approximately equal to 180°.

20. The method as recited in claim 4, further comprising:

measuring complex gain $(S21)^p$ along a passive path of a selected loop with the gain of the active path minimized;

measuring complex gain $(S21)^c$ along a composite path of the selected loop;

determining a relative complex gain $(S21)^e$ according to the formula $(S21)^e = 1 - (S21)^c / (S21)^p$;

adjusting an alignment of the selected loop so as to make relative complex gain $(S21)^e$ magnitude approximately equal to 0 while also making relative complex gain $(S21)^e$ phase approximately equal to 180°; and

readjusting an alignment of the selected loop so as to approximately minimize $|(S21)^C|$.

21. A system for automatically aligning a feed forward loop in a radio frequency power amplifier, the system comprising:

a radio frequency source configured to provide a radio frequency signal to the radio frequency power amplifier;

a radio frequency monitor configured to monitor a radio frequency signal from the radio frequency power amplifier;

a switch for determining what point on the radio frequency power amplifier the radio frequency monitor is in communication with; and

a controller configured to control an output of the radio frequency source and to control a position of the switch.

22. The system as recited in claim 21, wherein the radio frequency source and the radio frequency monitor at least partially define a network analyzer.

23. The system as recited in claim 21, wherein the controller comprises an automatic test equipment controller.

24. The system as recited in claim 21, wherein the controller comprises a personal computer.

25. The system as recited in claim 21, wherein the controller is configured so as to control a position of a switch of the radio frequency power amplifier.

26. The system as recited in claim 21, further comprising a terminator configured to be placed in electrical communication with an output of the radio frequency power amplifier.

27. A radio frequency power amplifier comprising:

a signal cancellation loop comprising a delay;

an error cancellation loop; and

wherein the signal cancellation loop further comprises a switch having a closed position in which a radio frequency signal is communicated from the delay of the signal cancellation loop to the error cancellation loop.

28. The radio frequency power amplifier as recited in claim 27, further comprising a non-switchable conductive conduit configured to communicate a radio frequency signal from a

main amplifier of the signal cancellation loop to a group delay filter of the error cancellation loop.